



# MECHANICAL DATA SHEET: VESSEL

PLANT ITEM No.

24590-PTF-MV-TLP-VSL-00009A

Project:	<b>RPP-WTP</b>	P&ID:	<b>24590-PTF-M6-TLP-P0001</b>
Project No:	<b>24590</b>	Process Calculation:	<b>Deleted</b> $\Delta$ 2
Project Site:	<b>Hanford</b>	Vessel Drawing	<b>24590-PTF-MV-TLP-P0001</b>
Description:	<b>LAW SBS Condensate Receipt Vessel</b>		

## Reference Data

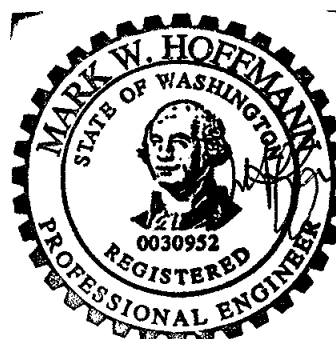
Charge Vessels (Tag Numbers)	<b>Not Applicable</b>
Pulsejet Mixers / Agitators (Tag Numbers)	<b>TLP-PJM-00001, TLP-PJM-00002, TLP-PJM-00003, TLP-PJM-00004, TLP-PJM-00005, TLP-PJM-00006, TLP-PJM-00007, TLP-PJM-00008</b>
RFDs/Pumps (Tag Numbers)	<b>Not Applicable</b>

## Design Data

Quality Level	<b>CM</b>	Fabrication Specs	<b>24590-WTP-3PS-MV00-TP001</b>		
Seismic Category	<b>SC-III</b>	Design Code	<b>ASME VIII Div 1</b>		
Service/Contents	<b>Radioactive Liquid</b>	Code Stamp	<b>Yes</b>		
Design Specific Gravity	<b>1.6</b>	NB Registration	<b>Yes</b>		
Maximum Operating Volume	gal	Weights (lbs)	<b>Empty</b>	<b>Operating</b>	<b>Test</b>
Total Volume	gal	Estimated	<b>218,400</b>	<b>1,769,100</b>	<b>1,303,300</b>
		Actual *			

Inside Diameter	inch	<b>312</b>	Wind Design	<b>Not Required</b>	
Length/Height (TL-TL)	inch	<b>328</b>	Snow Design	<b>Not Required</b>	
		Vessel Operating Vessel Design Coil/Jacket Design	Seismic Design	<b>24590-WTP-3PS-FB01-T0001</b> <b>24590-WTP-3PS-MV00-TP002</b>	
Internal Pressure	psig	<b>0</b>	Seismic Base Moment *	ft*lb	
External Pressure	psig	<b>0.22</b>	Postweld Heat Treat	<b>Not Required</b>	
Temperature	°F	<b>167</b>	Corrosion Allowance	Inch	<b>0.04 (Note 7 &amp; 8)</b> $\Delta$ 2
Min. Design Metal Temp.	°F	<b>40</b>	Hydrostatic Test Pressure *	psig	

Note: Please note that source, special nuclear and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA), are regulated at the U.S. Department of Energy (DOE) facilities exclusively by DOE acting pursuant to its AEA authority. DOE asserts, that pursuant to the AEA, it has sole and exclusive responsibility and authority to regulate source, special nuclear, and byproduct materials at DOE-owned nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.



EXPIRES 12/10/06

This Bound Document Contains a total of 5 Sheets.

2	1/27/05	Issued for Permitting Use	<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>
1	3/25/04	Issued for Permitting Use	Kathy Brightman	Chan Chung	Cliff Slater	Mark Hoffmann
0	12/18/02	Issued for Permitting Use	Jessica Jackson	Cliff Slater	N/A	Mark Hoffmann
REV	DATE	REASON FOR REVISION	PREPARER	CHECKER	REVIEWER	APPROVER

ISSUED BY  
RPP-WTP PDC



## MECHANICAL DATA SHEET: VESSEL

PLANT ITEM No.

24590-PTF-MV-TLP-VSL-00009A

### Materials of Construction

Component	Material	Minimum Thickness / Size	Containment
Top Head	UNS N08367	See Drawing	Auxiliary (See Note 1)
Shell	UNS N08367	See Drawing	Primary (See Note 1)
Bottom Head	UNS N08367	See Drawing	Primary (See Note 1)
Support (Skirt)	SA 240 304 with max. Carbon of 0.030 %	See Drawing	N/A
Jacket/Coils/Half-Pipe Jacket	N/A	N/A	N/A
Internals	UNS N08367	See Drawing	Thermowell Primary (See Note 1)
Pipe	UNS N08367 Seamless or N10276	See Drawing	See Note-1
Forgings/ Bar stock	UNS N08367	See Drawing	As Note-1 for Nozzle Necks
Gaskets	N/A	N/A	N/A
Bolting	N/A	N/A	N/A

### Miscellaneous Data

Orientation	Vertical	Support Type	Skirt
Insulation Function	Not Applicable	Insulation Material	Not Applicable
Insulation Thickness (inch)	Not Applicable	Welds Surface Finish	De-scaled as laid

### Remarks

\* To be determined by the vendor.

**Note 1: All welds forming part of the primary and auxiliary containment including nozzle attachment welds shall be subjected to 100% volumetric examination.**

**Note 2: Deleted**

**Note 3: Vessel volumes are approximate and do not account for manufacturing tolerances, nozzles, and displacement of internals**

**Note 4: Contents of this document are Dangerous Waste Permit affecting.**

**Note 5: This vessel is in a Black Cell.**

**Note 6: Deleted**  $\triangle_2$

**Note 7: BNI shall ensure that an additional 0.056" is available for erosion in the bottom head and the Seller shall report the minimum thickness required for all specified loading conditions, exclusive of erosion and corrosion allowances.**  $\triangle_2$

**Note 8: BNI shall ensure that an additional 0.036" is available for erosion in the lower 4" of the interior conical surface of the pulse jet mixers.**  $\triangle_2$

**Note 9: All hydrodynamic loads are for BNI internal use only and are to be disregarded by the Seller.**  $\triangle_2$



## MECHANICAL DATA SHEET: VESSEL

PLANT ITEM No.

24590-PTF-MV-TLP-VSL-00009A

### Equipment Cyclic Data Sheet

Plant Item Number	24590-PTF-TLP-VSL-00009A
Component Description	Parent Vessel

The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

Materials of Construction	UNS N08367
Design Life	40 years
Component Function and Life Cycle Description	This vessel receives intermittently LAW SBS condensate, off-spec effluent, and treated LAW concentrate. The vessel is emptied manually whenever it gets filled to the high level. Washdown is once per year.

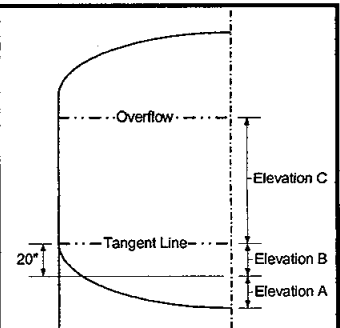
Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	-8	15	10	Nominal assumption
Operating Pressure	psig	-0.22	0	5700	
Operating Temperature	°F	68	167	5700	Uniform material temperature range, not between two points
Contents Specific Gravity		1.0	1.6	2080	Nominal assumption
Contents Level	inch	28	358	5700	Coincident with pressure cycles
Localized Features					
Nozzles		Within 50°F of operating temperature range		As above	

### Hydrodynamic Loading (Notes 6 & 9)

In normal operation, pulse jet mixers discharge liquid into the parent vessel imposing a cyclical hydrodynamic load on all internal components. Occasionally, an upset condition designated 'overflow' causes air to be discharged from any single pulse jet mixer. All internal components shall be designed for the combination of the normal operational hydrodynamic loads and overflow loads, and this load combination is also to be assumed to act concurrently with seismic loads.

The following table indicates the normal hydrodynamic pressure for at ranges of elevations in the vessel and the number of design cycles for each condition. The hydrodynamic forces cycle between the indicated pressure ranges applied across the projected area of the component. Positive hydrodynamic forces act in the radial, outward direction and the vertical, upward direction. Seller shall apply the radial load simultaneously in the radial direction and normal to the radial direction in the horizontal plane.

Normal Operation Hydrodynamic Pressure Range, psi						Number of Cycles
Elevation A		Elevation B		Elevation C		
Radial	Vertical	Radial	Vertical	Radial	Vertical	
-0.15 to 0.25	-0.15 to 0.15	-0.05 to 0.12	-0.15 to 0.15	-0.03 to 0.05	-0.06 to 0.15	3.7 X 10 <sup>6</sup>



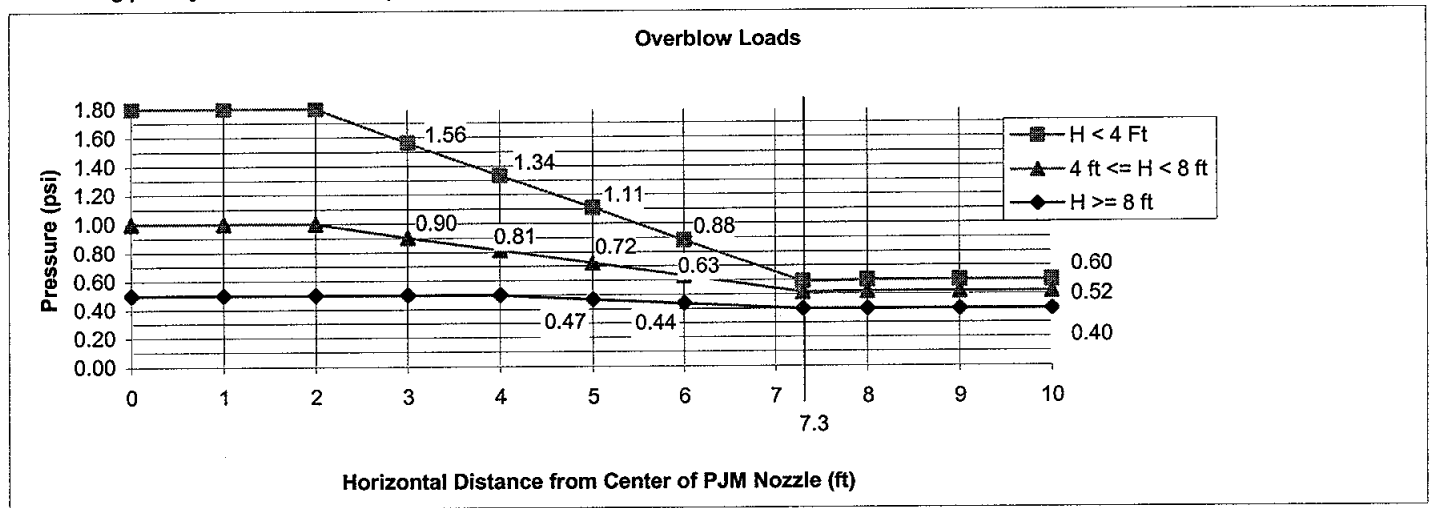


## MECHANICAL DATA SHEET: VESSEL

PLANT ITEM No.

24590-PTF-MV-TLP-VSL-00009A

Overblow loads vary as a function of the distance from the center of the overblowing pulse jet mixer nozzle and the elevation 'H' above the overblowing pulse jet mixer nozzle as plotted:



The overblow pressure shall only be applied to the projected area of the overblowing pulse jet mixer in the vertical, upward direction and to all surrounding components in the horizontal plane, radiating from the overblowing pulse jet mixer. Seller shall consider that any single pulse jet mixer may overblow 100 cycles.

### Notes

- Cycle increase:** The Seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.



## MECHANICAL DATA SHEET: VESSEL

PLANT ITEM No.

24590-PTF-MV-TLP-VSL-00009A

### Equipment Cyclic Data Sheet

Plant Item Number	TLP-PJM-00001, TLP-PJM-00002, TLP-PJM-00003, TLP-PJM-00004, TLP-PJM-00005, TLP-PJM-00006, TLP-PJM-00007, TLP-PJM-00008
Component Description	<b>Pulse Jet Mixers</b>

*The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.*

Materials of Construction	<b>UNS N08367</b>
Design Life	<b>40 years</b>
Component Function and Life Cycle Description	<i>These pulse jet mixers are cyclically loaded using vacuum to fully fill the vessel with process liquid and compressed air to fully empty the vessel. The pulse jet mixers are contained within a parent vessel with varying liquid level. They shall be designed to cycle between the maximum design pressure and the minimum design pressure plus the external static head imposed by the parent vessel. The pulse jet mixer supports shall be designed to cycle between fully buoyant (pulse jet mixer empty and parent vessel full) and fully loaded (pulse jet mixer full and parent vessel empty) in addition to thrust.</i>

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	<i>FV</i>	<b>83</b>	<b>10</b>	<b><i>Nominal assumption</i></b>
Operating Pressure	psig	<i>FV</i>	<b>58</b>	<b>3.7 X 10<sup>6</sup></b>	
Operating Temperature	°F	<b>68</b>	<b>167</b>	<b>3.7 X 10<sup>6</sup></b>	<i>Pressure cycles to be at 167° F and non-coincident with temperature cycles. The range given is uniform material temperature range, not between adjacent points.</i>
Contents Specific Gravity		<b>1.0</b>	<b>1.6</b>	<b>2080</b>	<b><i>Nominal assumption</i></b>
Contents Level	inch	<b><i>Empty</i></b>	<b><i>Flooded</i></b>	<b>3.7 X 10<sup>6</sup></b>	<b><i>Coincident with pressure cycles</i></b>
Localized Features					
Supports		<i>As above</i>		<i>As above with contents level changing coincident with pressure cycles.</i>	

### Notes

- Cycle increase:** The Seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.